EMDI Working Paper

SUSTAINABLE RURAL LIVELIHOODS

prepared by

Tania Li, Ph.D. and Drs. Sulaiman Mamar, M.A.

with support from the

Environmental Management Development in Indonesia Project

Halifax and Jakarta

June 1990

EMDI

The Environmental Management Development in Indonesia Project (EMDI) is designed to upgrade environmental management capabilities through institutional strengthening and human resource development. A joint project of the Ministry of State for Population and Environment (KLH) and the School for Resource & Environmental Studies, Dalhousie University, EMDI supports KLH's mandate to provide guidance and leadership to Indonesian agencies and organizations responsible for implementing environmental management and sustainable development. Linkages between Indonesian and Canadian organizations and individuals in the area of environmental management are also fostered.

Currently in its third phase, EMDI has received generous funding from the Canadian International Development Agency at each stage. CIDA provided C$2.5 million to EMDI-1 (1983-1986), C$7.7 million of EMDI-2 (1986-1989), and is contributing C$31.1 million (base budget) to EMDI-3 (1989-1994). Significant contributions, direct and in kind, have been made by KLH and Dalhousie University.

EMDI-3 emphasizes spatial planning and regional environmental management, environmental impact assessment, environmental standards, hazardous and toxic substance management, marine and coastal environmental management, environmental information systems, and environmental law. The opportunity for further study is offered through fellowships and internships for qualified individuals. Within the publications program, *The Ecology of Indonesia Series* is supported. Linkages with NGOs and the private sector are encouraged.

EMDI supports the University Consortium on the Environment comprising Universitas Gadjah Mada, Universitas Indonesia, Institut Teknologi Bandung, the University of Waterloo, and York University. Included in EMDI activities at Dalhousie University are research fellowships and exchanges for senior professionals in Indonesia and Canada, and assistance for Dalhousie graduate students undertaking thesis research in Indonesia.

For further information about the EMDI Project, please call or write:

EMDI Project
School for Resource
& Environmental Studies
Dalhousie University
1312 Robie Street
Halifax, N.S. Canada B3H 3E2
Tel: 902 - 429-3632
Fax: 902-429-3728
Cosy: EMDIHFX
Telex: 019-21863
Envoy: SRES

or

Proyek EMDI
Kantor Menteri Negara
Kependudukan dan Lingkungan Hidup
Jl. Medan Merdeka Barat 15
Jakarta 10110
Indonesia
Tel: 62-21-380-7566 or 62-21-380-2183
Fax: 62-21-380-2182
Cosy: EMDIJKT

EMDI Working Paper

SUSTAINABLE RURAL LIVELIHOODS

prepared by

Tania Li, Ph.D. and Drs. Sulaiman Mamar, M.A.

with support from the

Environmental Management Development in
Indonesia Project

Halifax and Jakarta

June 1990

Environmental Management Development
in Indonesia

EMDI is a joint project of the Ministry of State for Population and Environment, Republic of Indonesia, and the School for Resource and Environmental Studies, Dalhousie University, Halifax, Nova Scotia, Canada. It is funded by the Canadian International Development Agency (CIDA).

Proyek EMDI
Menteri Negara Kependudukan
dan Lingkungan Hidup
Jl. Medan Merdeka Barat, 15
Jakarta 10010
Indonesia

EMDI Project
School for Resource &
Environmental Studies
Dalhousie University
Halifax, Nova Scotia, Canada
B3H 3E2

© 1990 Tania Li and Sulaiman Mamar
Hak cipta dilindungi oleh undang-undang

About the authors:

Dr. Tania Li is a Canada Research Fellow and Assistant Professor of Sociology and Social Anthropology at Dalhousie University in Halifax, Nova Scotia, Canada

Drs. Sulaiman Mamar is an Assistant Professor of Anthropology at Universitas Tadulako, in Palu, Sulawesi, Indonesia

SUSTAINABLE RURAL LIVELIHOODS

BACKGROUND

This is a preliminary report based on a two week rapid appraisal of five desas in the kecamatans of Tinombo and Tomini, Kabupaten Donggala, Province of Central Sulawesi during the period 12-24 February, 1990. The study was undertaken as a joint project by Dr. Tania Li of Dalhousie University, Halifax, Canada and Drs. Sulaiman Mamar of Universitas Tadulako, Palu, Indonesia, with financial support from the Environmental Management Development in Indonesia Project.*

The purpose of the study was to obtain preliminary information on population-environment interactions in desa close to the Tinombo-Tomini border. This area has recognizably poor and degraded lands and presents immediate problems of livelihood security to the rural population. The study was a precursor to a three month field research project planned for the period May-August 1990, and provided information which will be used in the detailed research design. The preliminary study and its successor are also intended to provide data relevant to the planning of rural development activities proposed for the area by the Sulawesi Regional Development Project. *

KEY ISSUES

Key issues to be addressed in this report are:

A. The patterns of land settlement, land use, land degradation and land tenure, and their implications for livelihood and livelihood security.

B. Potentials for more adequate and secure rural livelihoods based on a) the opening of new lands and b) the rehabilitation of poor and degraded lands.

C. Current agricultural forms and practices, and their costs, benefits and sustainability from the point of view of farmers.

D. Intra- and inter-household patterns of resource access and use, and the division of labour by gender and generation.

RESEARCH PROGRAM

A preliminary statement is made regarding the focus, objectives and methodologies proposed for the longer term research program. Significant issues include the need to address livelihood issues from the regional, as well as local level perspective; the need to obtain both qualitative and quantitative data as a baseline for long term research in the area over a period of five to ten years; the intention to include both basic research and participatory action-research components; and the relationship of the research to regional, national and broader Southeast Asian concerns and objectives.

APPENDICES

Available on request are appendices detailing information obtained on each of the five desas and accounts of local history.

---

* See 6.5 below.

1.0 Research Background And Focus

1.1 *Research Focus*

Ensuring a secure and decent livelihood for the rural population of developing countries has become a key concern of national governments, donor agencies, and rural people themselves. While increases in productivity in rural areas are often required in order to keep pace with population growth and other pressures on resources, equally important for the quality and security of rural livelihoods are equitability in the distribution of the costs and benefits of rural development, and sustainablity in the patterns of resource use.

Research is required at the community level to investigate the relations between the three critical aspects of rural development -- productivity, equity and sustainability. More needs to be known about how rural people actually obtain their livelihoods, about the social relations which make, or could make, these livelihoods more adequate and secure, and about the linkages between rural livelihoods and political and economic factors at the regional, national and international level.

1.2 *Research Area*

The area selected for intensive research consists of five desas in the border area between the Kecamatans of Tinombo and Tomini, Kabupaten Donggala, Central Sulawesi. Selection was based upon information contained in the Central Sulawesi Provincial Development Status Review, a document compiled in 1989 by a team from the University of Guelph for the Directorate General of Regional Development under the Sulawesi Regional Development Project.

The Review (hereinafter abbreviated to PDSR) identified these villages as being particularly poor and critical, with people farming steep and badly degraded hillsides. Physical signs of degradation are most in evidence in the foothills, and include erosion, land slides, and entire hillsides where Imperata grass fails to succeed to forest regrowth, producing poor yields of maize and other crops. From the perspective of the farmers, the land is much less fertile and productive than it was in previous decades, and they cite poor lands as the principal explanation for their own poverty and for the high rates of out migration from these villages. The area has a very narrow coastal plain, so the pressures on upland areas as sources of livelihood are intense, particularly in the foothills most accessible to the coastal road. Other areas along the same coast line are experiencing the beginning of some of the same upland problems, though in less severe forms since more opportunities exist for sawah or cash crop production on flatter lands.

The villages selected for intensive study are Dongkas, Dusunan, Tibu, Bobalo and, as a contrast, Mensung which lies on the fringe of the transmigration site at Kota Raya and has attracted many local migrants from poorer areas seeking the opportunity to open new more fertile lands. A considerable proportion of the inhabitants of Mensung originated from Bobalo and Dusunan.

1.3 *Research Process*

The research comprises several phases. After a review of secondary materials, a two week rapid appraisal of the five villages was undertaken. Land status and land use were observed, and village leaders and farmers in a number of village subdivisions (RK) were interviewed, with an attempt to cover each of the distinct agro-ecological zones. Approximately eighty hours of interviewing was undertaken. Interviews with village

officials provided an overview of the history of the village, its past and current land use, and the movement and settlement of people. Leaders and elders of each selected RK (village subdivision) were asked the same questions with a more specific local focus , i.e. who were the first people to open up this area of land, when, what was the state of the land then, what did they plant, how many crops could they obtain per year, and how has the population composition and land use changed over time up the present. Individual farmer interviews probed into current livelihood strategies ,i.e. what people were growing, where, why, and under what constraints. Some interviews were undertaken with women leaders and farmers, although obtaining good access to women's knowledge and experience will require a longer research process with the assistance of local women interpreters. The language used by the researchers throughout was Indonesian, although fewer than fifty percent of farmers had an adequate grasp of the national language and interpreters assisted by interviewing in the local language, Lauje.

The second phase of the research will be a three month field study in the same villages. It is proposed to follow on with a longer term project over a period of five to ten years. More details of the proposed research approach are reported below under Research Design.

The results of rapid appraisal, reported in detail in this document, should be regarded as provisional and subject to correction and amplification on the basis of the longer studies. Rapid appraisal has the advantage of producing significant amounts of data in a timely manner. It is being used here as a tool for identifying key issues and orienting further research. Not all of the data have yet been verified or cross-checked, and interpretations based on them must therefore be heavily qualified.

2.0 Interaction Of Population And Environment

Key issues in the interaction between population and environment examined here are the patterns of land settlement, land use, and land tenure.

2.1 *History*

The Lauje, who are the indigenous people of the area, consider the area around the Tinombo-Tomini border to be their heartland, so that their residence in the area started with the very first ancestors, at the beginning of creation. The total number of people who speak Lauje is between ten and twenty thousand, although the close similarities between Lauje and neighbouring languages (Tajio to the south west and Tialo to the east) make precise boundaries difficult to draw.

The Lauje have traditionally farmed the hills with upland rice and maize, using a swidden cultivation system. The reported persistence of large areas of uncut primary forests in the central mountains of the peninsula together with local historical knowledge suggest that they have favoured the foothills and first range of mountains, and have only slowly moved further inland.

At a specific point in time, dated by local informants as around 1800, the Lauje split into two groups, one of which maintained and still maintains the traditional customary practices (adat), lifestyle and extensive swidden practices on the inner hills. These are the so-called "suku terasing", who will be referred to in this report by the local term Lauje-bela. The other group, which has no distinguishing name, became oriented towards the coastal and lower foothill zone, towards Islam, and towards life in larger and less mobile settlements.

A second major movement of Lauje down to the coast occurred in about 1910 under compulsion from the Dutch who ordered them to settle and plant coconut trees. This further emphasized the split between the two groups as those I am calling the Lauje-bela, who did not want to be ruled, retreated further inland. The Lauje-bela are not a remote and uncontacted people of the type implied by the label "suku-terasing". They grow cash crops such as onions and garlic, and they have been exposed to Islam, trade and other cultural and economic influences for several generations through their residence in the lower foothills near the coast. Their gradual movement further inland has been a complex outcome of political and ecological pressures.

2.2 *The Process of Land Opening*

The different practices and preferences of the two groups of Lauje remain relevant to the contemporary process of opening new land. In common with other swidden cultivators of Southeast Asia, the Lauje-bela have a preference for making small gardens in primary or heavy secondary forests where the land is most fertile, weed problems are minimal, and forest regeneration swift and complete. The lowland Lauje also recognise the superior productivity of swiddens cut from thick forests, but their orientation towards the coastal area, mosques, schools, markets and other facilities makes them reluctant to move to better lands on the inner mountains. They have therefore tended to use the lower foothills and first mountain range and river valleys quite intensively, farming the hillsides repeatedly on ever shorter swidden cycles until the land becomes too poor, before moving a step further inland or opting instead to look for wage opportunities in the coconut groves on the coast.

The sequence which appears to have occured is one in which the Lauje-bela have moved in small groups of about ten households, cultivating a valley or hillside but moving on fairly quickly further inland while the land they first cleared lower down is filled in and then repeatedly cultivated by the lowland Lauje moving more slowly (and reluctantly) inland.

2.3 *Rainfall*

Rain is more abundant on the inner hills, which catch moisture from the north and west of Sulawesi as well as from the south and east. There is also dew caused by the higher altitude. The lower foothills around Tinombo catch only rains from the south and east, and the land is consequently too dry for cultivation of staples such as maize during about six months of the year. There is no irrigation of any kind, and access to rivers and springs for domestic water is a significant factor determining settlement patterns.

2.4 *Land use*

Because of the greater fertility and moisture of the upland swiddens, the Lauje who live there, both Muslims and Lauje-bela, are able to grow upland rice as well as maize (three harvests per year) and root crops. Onions, garlic and tobacco are cash crops that have been produced in the area for several decades at least. Tree crops such as cocoa and cloves have been more recently introduced, and the Lauje-bela are apparently also participating in these new activities under the guidance of missionaries (PDSR).

In contrast the land farmed by the Lauje on the foothills is no longer capable of producing hill rice, and maize and root crops are grown for subsistence although poor soils and inadequate rainfall mean that in general only one maize crop per year can be expected. Swiddens in the foothills are left to regenerate for one to five years, depending on the state of the land and the number of alternative more fertile plots individual farmers have at their disposal. In addition to subsistence food production, poor farmers adopt a

number of strategies including wage work in copra production, and foraging for the wild root crop ondot, the traditional hungry season food. Those with some capital plant tobacco, or invest in long term tree crops, especially cocoa. Lauje living on the narrow coastal plain own or work in coconut gardens, while many live on the lands below but farm the hills above, planting subsistence and/or cash crops, according to their means and priorities.

2.5 *Land types and status*

The most gross and obvious distinction made between land types is between flat coastal land, hilly sloping land, and inland level areas along river valleys or mountain shoulders. The main distinctions in vegetation are between primary forest, secondary bush forest at various stages of regrowth and alang-alang grasslands. No doubt many more refined distinctions exist which will become clear after further research.

Alang-alang land is regularly used for food and cash crop production (especially tobacco), though light forest is used in preference if available. Alang-alang land is cleared by hoeing twice before planting. Alang-alang land frequently burns accidently, slowing or preventing the regeneration of bushes and forests which locals say would otherwise, eventually, grow back. Lamtoro is one tree species capable of quickly "beating out" alang-alang and restoring soil fertility, especially if accidental burns can be avoided. It is not planted intentionally, but grows back naturally on some of the lower hill slopes where it is an indigenous species.

Perceptions of the usefulness of lamtoro are varied. Its capacity for fertilizing soil is widely known. It is used for livestock grazing, firewood, and for swidden cultivation, although farmers do not always select lamtoro land where other reasonably fertile bushy forests are available because of three disadvantages: it is considered to be a very hard wood and difficult to cut; its leaves are so fine they do not catch or spread fire well and it is consequently difficult to secure a good burn on the swidden, the farmer having to pile up its branches and burn it repeatedly; and further it reseeds and regenerates so quickly and vigorously that it is difficult to weed. Lamtoro swiddens are therefore seldom used for more than one year. On the other hand, farmers who are accustomed to using lamtoro land acknowledge these characteristics, but find the labour tolerable and the rewards worthwhile. No efforts have been made to reseed grasslands with lamtoro, possibly because of its various drawbacks. Any initiatives for regreening with local or imported varieties of lamtoro should carefully study its current uses and pay attention to the local perceptions of this plant and ensure that farmers are consulted in the process of weighing its advantages and disadvantages.

2.6 *Population settlement, intensified land use, and land degradation.*

The process of land degradation in the foothills is not the work of the Lauje-bela, as is often assumed by officials, but the result of the settlement of the lowland, Muslim, coastally oriented Lauje in areas where rainfall is inherently inadequate and where their traditional extensive swidden practices have not adapted in pace with their desire to remain in the area in the long term. However an indigenous process of intensification of land use, together with the assertion of more defined and long term rights to particular plots of land is in progress. Further research will show whether this intensification process is capable of re-establishing an effective ecological balance in the long term.

Preliminary analysis indicates that the process of intensification has the following characteristics:

a) In Lauje traditional practice, (subject to further verification) it appears that the individual who originally cleared a plot of forest had the right to

recultivate the plot or to pass on that right to descendents. However since upland Lauje moved over large areas and did not cut large swiddens in one place, claims to the right to re-use land were not very significant, and anyone who wanted to use a piece of land could ask to borrow it from the "owner" if he could be identified, or use it anyway if not.

b) Particularly attractive pieces of land, such as land near rivers or springs, or level land suited to house sites and fruit trees is more coveted. The pioneers who cleared the land may stay there for their whole lives, and some at least of their descendents are likely to choose to remain in the area, asserting clear claims to fruits of the trees. Apparently all the descendents have rights to the fruit, even if they have moved away. Land settled by ancestors and planted with numerous species of fruit and other useful trees is called a wayab, and has special social, economic and spiritual significance.

c) While not all former swiddens are attractive enough or contain enough quantity and variety of fruit trees to be considered a wayab, planting of fruit or other useful trees on a swidden plot is regarded as a sign of prior use of, and therefore rights to the land. It is described as a personal signature (tanda tangan). Planting of fruit trees prior to resting swiddens does not seem to be routine, however, and not many fruit trees were observed except around groups of houses near water sources. Home gardens do not seem to be well developed.

Fencing has become widespread in the foothills because of the nuisance of cattle, goats, and most especially wild pig which roots up and destroys anything planted. The wild pig problem is thought to have become more severe over the last thirty years or so. Pigs appear to be attracted by the forage opportunities presented by garden plots, even those right down in the most densely settled areas on the coast. The pigs are unafraid of the lowland Lauje who as Muslims are reluctant to hunt and kill pig, and, unlike their Lauje-bela cousins, are no longer diligent at performing the rituals which once kept all pests at bay.

Farmers without fences are forced to guard their fields at night, sometimes building two or three huts and dividing family members between each of them, and taking turns to watch and sleep. Another strategy is to plant at the same time and on plots directly adjoining others, so that the losses are shared and minimized for each farmer (although those on the edges of the forest suffer the worst). The pig problem may partly account for the pattern of a group of households stripping and farming entire hillsides, with greater resulting ecological damage (shortage of suitable land conveniently close to the hamlet site is an alternative explanation). In general, farmers have to weigh the costs of fencing in relation to their expected losses from pests and their alternative uses of time and capital.

The most basic form of fencing is to pile up brush from the fields around the edges, and try to prevent them from burning. Fences made from bamboo or other woods do not last more than one to two years, are time-consuming, not very effective, and do not serve as long term territorial markers. The most favoured form of fence is made from Kayu Java poles of which root easily forming permanent, live fences.

Kayu Java is not native to the area and is said to have been introduced by the Japanese to support a telegraph line from Tinombo to Parigi. Locals seeing its potential began lopping branches and planting them as fences, which have slowly spread. However the wood is not free -- owners of an established Kayu Java fence either lop the branches themselves to build new fences, or sell them to others at Rp25-50 per pole. Poles then have to be carried to the desired location, possibly several hours walk up into the hills. Because of the required investment in labour and cash, a piece of land fenced by Kayu Java is a distinctive, individualized and prized property. Once a field is fenced, the farmer has

every incentive to obtain maximum benefit from it by planting numerous varieties of food, cash and tree crops, and trying to retain its fertility to make continued use of it for as long as possible. Where available, lamtoro is used for ties between Kayu Java fence posts, or to form the fence posts themselves if Kayu Java is not available, since a proportion of the poles will apparently root.

Although the primary rationale for fences is to protect against the depredations of the wild pig, the investment of labour and cash, the physical signs of enclosure and the planting of tree crops are part of an intensified pattern of land use and the assertion of more permanent land use rights.

2.7 *Access to land resources*

Although the land in the foothills is degraded, and this can be associated with a shortage of suitable land causing over frequent use, there does not seem to be a perception that land itself is in short supply. On persistent questioning farmers reasserted that there was always land of some quality available to be used, and that the "owner" would usually be willing to lend the land to someone who wanted to plant a short term crop like onions, root crops or maize. The borrower should not, however, attempt to plant fruit trees or any other long term crops, which clearly limits their agricultural options. No rent or defined share of the crop is paid to the owner, although gifts of bundles of maize or other produce are appropriate as signs of gratitude and recognition of ongoing social relations.

The main issue confronting farmers as they plan their production strategy for the year is not whether land is available, but whether the land to which they are entitled by clearing it themselves or through inheritance, or land which they can borrow, is sufficiently fertile and accessible to make an investment of labour worthwhile, when compared to other opportunities (e.g. local wage labour in copra production, rattan extraction, construction, or migration in search of wage opportunities or new lands). This is a situation which changes from year to year, as fields regenerate at different rates, social relations brought into play to acquire borrowed land shift, and alternative more productive opportunities may emerge.

With the introduction in the lower and upper hills of cocoa, cloves, kapok and jambu mete as cash crops in the last ten years, more land has become invested with clear signs of ownership, and removed from the cycle of swidden cultivation, but this is not yet perceived as a source of land shortage for short term food or even cash crop production (onions, tobacco).

In the long run, however, as tree cash crops become more popular and current swidden areas are converted as well as new lands (often already claimed by the upland Lauje-bela) are opened up, the existence of permanent tree crops on the land may come to be the only recognized form of land "ownership", while other forms of entitlement formerly recognized (such as previous use for food crop production) become devalued and disregarded. Two policy implications could follow: that the full range of indigenous forms of land entitlement have to be recognized and enforced, and also that everyone in the area, including the poorest, should be encouraged and assisted to establish clear rights to land, possibly through planting tree crops, before all suitable land is "claimed" by others.

Certain reasonably fertile and well located lands are more attractive for the establishment of tree cash crops, and if the individual claiming rights to the land has no immediate plans to plant such crops (because of a shortage of labour, capital or seeds, or because of alternative uses for these elements), another may ask to use the land. In the case of long term tree crops land cannot be borrowed. The basis of the arrangement is to divide the land and trees, once established, into shares. Variations were described, and actual arrangements may depend on the social and kinship relations between the parties, the condition of the land, and the need for fencing. The approximate basis seems to be as

follows: half shares if the landholder supplies the seeds; two thirds to the labourer if he supplies the seeds, or if there is heavy labour involved in clearing the primary forest. In general these arrangements only appear to be made by substantial landholders who wish to develop large areas of land in "new" settlement areas with minimal capital investment. Small farmers seem to hold on to their own land hoping to develop it themselves.

The official approach to land tenure and registration as implemented at the provincial, district and subdistrict levels needs to be researched. Very few people in the area have formal land certificates issued by Agraria, the few that exist being only for coconut land or for sawah land allocated to transmigrants. Licenses (acte) issued at the subdistrict level are somewhat more common, but still restricted to coconut land. Without these documents farmers cannot obtain loans from the KUD or the BRI, but no small farmers would attempt to do this anyway, the only applicants being those who already have significant capital.

3.0 POTENTIAL FOR MORE ADEQUATE, SECURE AND SUSTAINABLE LIVELIHOODS

3.1 *New land resources*

The population of the coastal and foothill areas is no longer able to produce a reasonable living based on subsistence crops such as maize and cassava, and is unable to grow the most preferred food, rice, and so is dependent on meeting food needs in part at least through the market. Cash crops are integral to the local economy and there is a long established tradition of growing onions and tobacco for sale in all areas of the hills. Hundreds of thousands of cocoa trees have been planted in the area in the last five years. Almost everyone would like to plant cocoa trees, and those who are held back lack not ambition but suitable land, capital, seeds, extension advice, and access to roads, markets and schools at a reasonable distance from the potential farm land. The opening up of reasonably level and fertile but currently distant and inaccessible interior hill lands to tree cash crop cultivation by the construction of roads is seen by village leaders and many farmers as the answer to their problems.

In this context, several issues will need to be addressed:

a) Economic and productivity questions are raised by the rush to plant just one or two tree crops, which risk flooding the market. The price for a kilogram of cocoa fell from Rp1300 in 1989 to Rp800 in 1990, a factor which does not yet deter farmers who still see the effort as worth while, although in the long run they may be disappointed. Price drops could possibly be offset in part by the development of primary processing facilities, retaining more of the "value added" in the area. Long run market research and diversification are urgently needed. The current rush to plant cocoa does not seem to be the result of any rational provincial plan or agricultural extension effort, but a spontaneous response by small farmers to the apparent market potential of a crop they observe others to be adopting, which is relatively quick to produce, and for which seeds are locally available (although often in short supply).

b) Environmental issues are raised by the cutting of established primary or heavy secondary forests in the uplands. Site selection criteria need to be established for permissible degrees of slope, and field size. Extension advice is needed on techniques for terracing, slope stabilizing cover and shade species, and appropriate crops and varieties. Erosion, indicated by exposed tree roots, was observed in several upland cocoa gardens, and the

farmers themselves are concerned about the biophysical stability of their tree crop plantations, a form of land use in which they do not yet have much experience.

c) Equity issues are raised by the manner in which new land resources are allocated to people. Recent experience in two new settlement schemes in desas Mensung and Bobalo is that powerful urban dwellers, business people, and regional or local officials who have advance notice of new road plans and access to channels for acquiring permission to open extensive new tree crop gardens, are able to claim large areas of the new land, and make their claims stick.

Poor people lacking information and resources are deprived of rights they once had to other forms of cultivation in the area, such as the production of food and more traditional cash crops, and if they are attracted into the area from elsewhere usually arrive late on the scene, after the land has been staked by others. They either work as wage labourers establishing the new estates or are given permission to plant tree crops on a share basis, as outlined above. Thus while they do gain something from the new lands, they gain less than the powerful people making prior and stronger claims, and inequality in the region is further exacerbated.

A quantitative sense of the seriousness of the distribution issue could be obtained through a case study of a new land development scheme, documenting the process of land allocation and the relative gains and losses of different social groups.

Each of the villages in the study was involved in formulating plans for opening lands for tree cash crop farming, through building new roads into previously inaccessible areas further inland from the coast. They were being encouraged to make such plans by officials at Kabupatan and Kecamatan level, from whom the village leaders hoped to obtain licences to clear forest land for permanent cultivation, and assistance with costs for roads, schools and other infrastructure. In some cases there appeared to be an expectation of private sector involvement, for example through higher level officials granting timber extraction licences to private firms, who would then build logging roads into the interior from which villagers would benefit. More information is needed on the nature and origin of these plans. Some plans were being made partly in response to hopes raised by the Sulawesi Regional Development Project for new investments in the region (the word "proyek" is used locally to refer to the transmigration sites, and a widespread perception is that the Canadian development "proyek" is a project for opening new lands).

In only one village, Dongkas, was the village head observed to be making a concerted effort to inform poor people of opportunities to obtain a holding in new land that is to be developed, and encouraging them to register their names. In all new land schemes, careful monitoring is required to ensure that information, resources and secure rights are extended to the poorest people whose current livelihood is most inadequate and insecure, i.e. those on the coastal plain and those farming the degraded hillsides who do not have trees or other cash crops.

3.2 *Rehabilitating old lands*

As an alternative or in addition to opening new lands, there may be opportunities to rehabilitate degraded lands in the hills. This has obvious economic advantages, making unproductive lands again productive; it has environmental advantages, restoring nature and relieving pressures on uplands and forested areas; it also has equity advantages in that it focusses on the resources currently controlled by the poor, i.e. , degraded lands, seeking to make their livelihoods more secure in contexts already familiar to them. The long term

investments of time and effort required are unlikely to attract powerful interests to take over the resource, although that possibility should not be discounted as land improvements make the area more attractive.

Rehabilitation schemes do not necessarily address the needs of the landless. In the area being discussed it is arguable whether there really are landless people, since land can apparently always be borrowed, especially for short term crops. However land for long term tree crops and intensive investment cannot usually be borrowed, as noted above, so access to land may present a problem for some households.

As with the opening of new lands, critical issues are raised, though quite different ones. The main issues relate to productivity, seen from the viewpoint of the labour investment and long and short term livelihood security of the poor.

Productivity can be measured in relation to land or in relation to labour. White (1984) and Collins (1986) have thoroughly discredited the myth that poor peoples' labour has a low opportunity cost and can be considered as a very cheap or even free resource. Because they control such meager capital, land and other resources, the poor are forced to work very long hours at activities with very low returns to labour in order to survive. Labour, as their only resource, is also their most critical and limiting resource. The poor can generally afford few long term investments, such as terracing or fencing which make sense from the point of view of land improvement but not necessarily from the point of view of labour and livelihood, at least in the short run where immediate survival is at issue.

Chambers (1988) argues for a distinction between the very poor, who cannot make long term investments and plans, and the merely poor, who given the opportunity are able to sacrifice short term for long term livelihood gains and security. The very poor are often driven by their circumstances into adopting destructive practices, such as farming hills that are too steep without terracing or other protective measures, or over using land until it becomes barren and eroded. Development efforts, in his view, should be directed towards helping more people to move from being very poor to just poor, and preventing others from sliding backwards down the same slope. In this way, poverty and environmental problems can be resolved simultaneously.

In the area of Sulawesi under discussion here, the Lauje, who are traditional hill farmers, are now engaging in some destructive practices through economic necessity. These include clearing and farming very steep slopes which were left forested previously because of the danger of erosion and landslides, and over frequent use of swidden land, to the point where its capacity for regeneration is impaired and its productivity severely reduced. More detailed study at the household level will be necessary to establish whether it is possible to distinguish between poor and very poor in this context, how this is to be measured, and in what precise ways their strategies towards land and labour utilization differ.

Specifically in regard to Indonesia, Dove (1986) has argued convincingly that in the outer islands, the critical limiting factor on production is labour. Abundant land is available, but its productivity in relation to labour is very variable, depending on its condition and location, so that farmers are always making decisions about where the best returns to their labour can be found. Rational strategies to maximize returns to labour by farmers in the outer islands have led to the adoption of extensive agricultural practices, such as swidden cultivation and tree cash crops. Dove has also pointed out, and local knowledge in the research area confirms, that the first reason for moving from one swidden plot to another after 1-3 years is not the declining fertility of the soil, as was once assumed, but the increased labour demanded by the task of weeding on a plot that has been used repeatedly.

Moves to rehabilitate and intensify the use of degraded lands in the foothills will have to consider the situation from the perspective of the farmers:

a) Will farmers be able to obtain sufficiently high returns to labour from their work in rehabilitating poor lands to make this option more favoured than that of seeking newer, fresher lands to cultivate?

b) If new lands are not available to farmers or the options there seem less attractive, how do the returns to labour from rehabilitation compare to those from wage work in coconut groves or construction, temporary or permanent migration or other options?

c) What is the time lapse before benefits from rehabilitation will be reaped, and can the poorer farmers afford to invest time in long term efforts at the expense of daily wage work or other activities required to keep themselves and their families alive in the meantime?

d) Can traditional and hitherto rational patterns of extensive agriculture be quickly changed, and new ways of thinking about land and soil as precious and scarce resources be fostered? Is the time right? Are the farmers beginning to think about these things already, and just looking for appropriate means to intensify land use? The evidence cited on patterns of intensification above suggest that this might be the case, at least for some farmers.

e) Can ways of intensification be found that avoid the complexities of packaged agroforestry and that instead build on traditional knowledge and skills, proceeding slowly and step-wise, thus becoming really accessible to the poorest? Can the process of transition be hastened, encouraged and assisted, or does it have its own rhythms, depending on population densities, land conditions, and other factors in the regional economy?

4.0 Existing Patterns Of Production

This section will describe the main land, labour and marketing activities engaged in by villagers, and some of the opportunities and constraints they present for obtaining adequate and secure livelihoods.

4.1 Coconuts

4.1.1 Tree ownership

The majority of the coconut trees in the area were planted between 1900 and 1930 by the ancestors of the present generation. Local historical knowledge claims that people were ordered by the Dutch to plant coconuts as they consolidated their economic dominance in the area in the first decade of the century. The age of the stock has three implications: a) it is no longer very productive, b) division of property equally among all siblings upon inheritance has made many current holdings very small and c) marriages and migrations into and out of the area over the years have led to a situation where, in each of the desas surveyed, it was acknowledged by the village leaders that 20-60% of the coconut trees on village lands are not owned by residents of the desa.

A further reason for outside ownership, which seems to have been a factor at least since the 1940's, is sale of trees in times of distress to wealthy outsiders in order to meet tax payments or other pressing needs. Mature trees currently sell for Rp15,000 each, and they continue to be sold in this piecemeal manner. Those acquiring the trees are occasionally village residents, but more often they are from other parts of TTM, or from the provincial capital, Palu. A few individuals are known to have slowly bought up thousands of trees in the area, managing their holdings through agents resident in Tinombo town.

Few new coconut trees or other intercrops have been planted below the old stock, and the pattern of external ownership in part accounts for this. Owners of trees, especially wealthier owners from outside the desas, adopt a strategy of maximizing returns to capital rather than land. They compare the costs of replanting to other options available to them, such as developing new lands. Whereas from the point of view of the village where the trees are located the coconut land is not being used to its fullest potential, the actual land use decisions are made by individuals residing outside the village with a wide range of investment options, of which local intensification is only one.

Some owners have acquired certificates of ownership to land which is planted in mature coconut trees, and when this land with its trees is sold, the transfers are formally recorded at village and district (kecamatan) levels. With a certificate, the land and trees can be used as collateral for loans. The majority of coconut owners do not have certificates, but transfers are still formally recorded in the village office.

Individuals residing in the village who wish to make use the land under coconut trees enter into negotiation with the owner. A common arrangement is that a family is permitted to build a temporary (bamboo) house on the lot, and plant non-permanent crops such as root-crops and bananas, in return for keeping the land under the trees free from weeds. Non-permanent crops do not establish any rights to the land, which clearly belongs to the owner of the coconut trees. Through this limitation imposed by coconut tree owners, a confusion of ownership rights to land and trees is avoided. Disincentives to the use of land under trees for food crops are the quality of the soil (often poor and sandy), destruction by soil pests, and, most seriously, the need to fence the land to protect crops from the wild pigs, cattle and goats that roam freely.

Three individuals, each owning substantial coconut holdings, were asked about their approach to rejuvenating their stock, and each had a different strategy:

a) Pay a worker to replant the land, for a fee of Rp1000 per tree, with the owner providing the seeds and fencing materials.

b) Ask a worker to replant the land, using his own seeds and materials, with the agreement that the trees have to be sold to the owner after 2 years at a price of Rp2000 per tree.

c) Allow an individual to plant new trees, using his own seeds and materials, with the agreement that should he ever wish to sell the trees, he could sell only to the owner, with the price to be fixed according to the age of the trees at the time.

The exact arrangements made and the access of landless people to labour and ownership opportunities in the coconut sector probably vary according to the kinship and social relations between the parties involved, a subject which will require further investigation.

4.1.2 Labour

Most of the labour involved in harvesting coconuts and processing copra is not performed by the tree owners but by specialist workers, for fixed fees. The tree climber is the most specialised and highly paid, receiving Rp200 per tree. Others are paid to collect up the fallen fruit (Rp1 per fruit); transport it to the processing station by bullock cart (Rp3.5 per fruit) and complete the copra process (Rp6 per fruit). Others do the least skilled work of weeding under the trees, for Rp100 per tree per weeding (usually three times per year). Specialised labourers in the sector who were interviewed had inherited the trade from their fathers, and did not themselves own any trees. Some claimed to have long term relationships with particular owners who could be relied upon to call them to work at every harvest, while others had only temporary labouring arrangements. The work associated with coconuts is seasonal, as fruit is harvested and processed every four months, so that all workers need additional sources of income. No women are employed as labourers in this sector.

4.1.3 Profits

The older trees in the area are estimated to yield 250 kg. of copra from 100 trees per harvest, harvesting three times a year. If it is assumed that 10 fruit are obtained per tree per harvest, then for a holding of 100 trees the total costs are as follows:

Table 1

Copra Production

	Number of Trees	Labor Cost per tree (Rp.)	Total in Rupiah
Costs to Produce 250 kg. of copra			
Weeding	100	100	10,000
Climbing	100	200	20,000
Collecting,transporting of fruit, etc	100	115	11,500
Tree tax @ Rp 3000/4 months			3,000
Total Cost per harvest			44,500
Revenues per harvest (i.e. 250 kg. of copra)			
1989: Market price for 250 kg. of copra			125,000
Less costs			44,500
1989 profits per harvest			80,500
1990: Market price for 250 kg. of copra			62,500
Less costs			44,500
1990 profits per harvest			18,000

The drop in copra price has left some owners unwilling to even harvest the crop, since the profits are now so meagre. Others have dropped the fees for the various labouring tasks in line with the price of copra.

4.1.4 *Potential of the sector to provide more adequate, secure and sustainable livelihoods*

A program to facilitate fresh planting of coconut or other intercrops in old coconut groves could increase the productivity of land in the area. New trees take about ten years to come into full production, so the impact would not be

immediate. New trees would benefit coconut workers who may acquire more steady labouring opportunities than are now available to them, but it is unlikely to change their status to that of tree-owners, so its "equity" potential is not great. A village census would be required to determine the actual number of individuals drawing an income from labouring in this sector, and the importance of this income source in relation to their other activities and options.

Local residents who own a few trees could also benefit from intensification. They have seen their living standards drop with the severe fall in the price of copra. Since division of property in the area is generally equal between men and women, one can assume that about 50% of tree owners are women, for whom coconut trees, however few, represent significant and secure assets.

Poor women who do not own trees acquire income from the processing and sale of coconut oil. Anyone is permitted to keep a fruit which has fallen from a tree, and women go out early in the morning to find fruit. More commonly, children go looking for the fruit before they go to school, and sell them to the women for Rp50 each, using the money for school snacks. They look again on their way home and in the evenings. Seven fruit make one bottle of oil, which sells for Rp750. The cooking process takes one hour, and fire wood also has to be found. An oil maker in Tibu estimated that about 40 women in the desa make oil on a regular basis, each selling about 5 bottles per week in the local markets. A village census would reveal more accurately how many women are involved in this activity, and whether there are ways to increase their income from this sector.

Coconut husks are the property of the tree owners, except that workers processing the copra are entitled to take enough for their own use as cooking fuel.

4.2 *Cocoa*

Cocoa trees have been planted by the thousands in the five villages in the last few years, although few have yet come into production (the waiting period is three years). The price of cocoa dropped from Rp1,200 to Rp800 per kilogram in the last year, but this is not deterring further plantings. Some of the constraints on poor people planting these crops were noted earlier. They include secure access to good land a reasonable distance from roads and capital for fencing and seeds.

Farmers are experimenting with different shade crops, the most common being banana, although others have also been tried, based on farmers' observations of practices elsewhere in the region. An effective extension program is urgently needed to cover aspects such as site selection, soil, slope, erosion hazards, maintenance of soil fertility, shade and cover crops. The possibility of local processing facilities should also be investigated, increasing labouring opportunities and value-added to the region.

The initiative for planting cocoa appears to be coming from men. Women are involved in weeding and tending the plants. It is not yet clear how the proceeds from the sale of the crop will be divided within the family; i.e., whether women's contribution of labour in production will be acknowledged through their access to cash, and through division of trees in equal shares upon divorce. It is also not clear whether the usual pattern of equal inheritance to women and men will be followed for these trees. If it is, women will become owners of trees over the next generation, and will also require knowledge of how to cultivate and manage the crop. The new pattern of social relations of production both within and outside the household that will evolve around this and other new tree crops is not yet clear.

4.3 *Cloves*

Although popular elsewhere in Sulawesi, this crop has acquired only limited popularity in the Lauje area to date, perhaps in part because of the long waiting period for production (eight years), the difficulty of fencing and of acquiring seeds, and lack of familiarity. The price of cloves rose from Rp2,500 kg. in 1989 to Rp7,000 in 1990.

4.4 *Kapok*

Small amounts of kapok have traditionally been planted in the area for domestic use in making pillows. Since 1985 when some purchasing agents came to the area looking for kapok to buy, the crop took on a cash value and new trees were planted. The villages with the most kapok are Tibu and Dusunan. Kapok seems to grow well in dry and depleted soils in full sunlight, and so may be suitable for some of the degraded areas in the foothills. The new trees planted have not yet borne fruit, the waiting period being at least ten years. Seeds are easily available, being picked up for free under long established trees. Women are heavily involved in the processing of kapok for domestic use, and may extend this role to the processing of kapok for sale, should a local industry emerge.

4.5 *Onions and Garlic*

These crops have been planted for decades in the upper hills. They require well drained sloping land with adequate moisture, an environment provided by the more frequent rains and dews in the higher altitudes. The upland Lauje, both Muslim and non-Muslim, plant this as their principal cash crop.

Garlic is considered the more difficult of the two to grow, and requires six months in the ground, but produces handsome profits at Rp4,000 kg.. Onions are three months in the ground and can be grown twice a year, selling for Rp1,200 kg. The return, if successful, is about ten times the cost of the planting stock, i.e. 100 kg. of onion or garlic sets (small plants) produces 1000 kg. of saleable product.

Two factors determine access to the potential of these crops. The first is a willingness to live in the uplands, far from the road and schools. Families sometimes have to choose between potential profits from these crops, other income generating activities available on the coast, the need for a daily income, schooling for children, and splitting up the family for part of the year. Some individuals who live in the lowlands but are attracted by the profit potential of this crop take up temporary residence in the hills for several months to manage the process. The school teachers in both Bobalo and Dusunan who have started small self help schools in the uplands are both involved in planting onions and garlic, a secondary income which makes upland residence attractive to them.

The second factor in production is capital. Since the planting stock or "sets" for onions and garlic are themselves saleable products, they are considered to be very expensive. Added to the initial capital requirement is a significant risk factor: the proper sequencing of rainy and dry spells is critical, the crop is subject to various pests and diseases, and it is apparently quite common for the entire crop to fail, losing even the value of the sets. This is a significant disincentive to those with little capital and slim margins of security in their livelihood strategies, especially given the relatively higher opportunity cost of their labour.

Two means by which individuals without capital can acquire sets are borrowing, paying back after the harvest or sharecropping, with the labour and the sets worth equal shares. In the latter case, the owner of the sets monitors the fields, to see if they are being properly tended. If the sets are destroyed through "acts of God" there is no penalty, but repayment is expected if a crop fails because of poor care.

Since onions and garlic are short term seasonal crops, they can be grown on any suitable hill slopes. Unlike the tree cash crops they are not part of a process of intensifying land use or consolidating land use rights and they are easily integrated into a shifting cultivation strategy. They can be grown on alang-alang lands that have been properly hoed.

An advantage of onions and garlic for farmers is that their storability. The harvest can be stored and sold in small amounts to meet weekly food costs at the local market. There may exist two classes of farmers planting the crop: those who rely on it to make up weekly shortfalls of cash to buy staples and relishes, and those who are able to realise a substantial capital sum from the sale of their entire crop, and contemplate further expanded investments. It was reported that some farmers lacking cash for daily subsistence sell all or part of the crop prior to the harvest at a substantially reduced price.

4.6 *Tobacco*

Tobacco is also a cash crop that has been known in the area for decades. According to local knowledge, the area was once famous for its tobacco, with the product being sold all along the coast.

Significant factors limiting participation in the production of this cash crop appear to be time and risk. The process of producing tobacco takes almost the whole annual cycle, so that other sources of food and income are needed while awaiting the harvest. Seedbed preparation and planting takes two months; the plants then mature in the fields and must be left to flower three times before harvesting begins. This maturing period can take 4-6 months, depending on the adequacy of rainfall. The leaves are then harvested every two weeks for four months, and during this period it is important not to have too much rain, or the leaves rot on the plant or when left to dry for a few days before being transported to the house for shredding and further drying. Uncertain rainfall thus poses a risk to farmers, who may find that the proceeds from a year's labour are less than expected. An advantage of the crop is that it is storeable and small amounts can be stored or sold to meet weekly cash needs. Alang-alang land on the shoulders of the foothills can be used for this crop, although in order to be sure of sufficient rainfall the fields tend to be at least one hour's walk into the hills from the coast.

Because of the long duration of the production cycle, advance sales of the crop prior to harvest by those lacking capital are apparently common, with profits being reduced accordingly.

4.7 *Rice*

There is no sawah land in the four desas surveyed near the border of Tinombo and Tomini. Lauje living in the interior hills plant hill rice as the preferred crop when opening a new, fertile swidden, unless they need food quickly, in which case they plant maize first, then rice, or intercrop the two. After the first year, some land is insufficiently fertile or contains too many weeds for a second crop of rice.

The planting of upland rice is still associated with the most traditional rituals and customs such as exchange labour for clearing, planting and harvesting. The annual harvest festival called *Tanta Loan* is timed in relation to the rice harvest, although it is

said to apply to maize and other crops and may be celebrated also be those who do not plant rice.

The poor quality of the over-used lands in the foothills prevents the majority of the population of the four villages from planting rice, unless they are prepared to go to live further inland, in the inner mountains. Rice is the preferred staple food, and those with a good cash income buy it on a regular basis, while the poorer majority eat it only occasionally.

Rice harvests in the regions along the coast that have sawah land provide wage opportunities for many village men. They are paid with a share of the harvest varying between one sixth and one fifth, depending on their relationship to the owner. It appears that access to this opportunity is restricted to those with close ties to the owners, since only three or four harvesters are employed per hectare. Women harvest upland rice with the traditional small hand knife, but are excluded from harvesting sawah which is done by men.

4.8 *Maize*

Maize is a traditional staple in the area, and is subject to various ritual protective measures. Improved varieties have apparently not been introduced. Women are responsible for seed selection and preparation. In upland areas with adequate rain it is possible to obtain three harvests from one field per year. In the lower foothills with inadequate rain, farmers said they were lucky to obtain one crop per year. Although there are techniques known in the area for preserving maize by pounding and grinding it to turn it into flour, these seem to be falling into disuse, at least in the foothills, as the meagre harvests are quickly consumed. Productivity per hectare per harvest also seems to be falling in the foothills, with an elderly farmer living on parched lands in a hamlet founded by his father at the turn of the century recalling that his harvest now is only once instead of twice a year, and only half the quantity per hectare he used to harvest on the same land in the 1940's. If rainfall data are available, it would be useful to determine whether the local perception that the area has become drier over the decades is accurate.

An investigation of local or hybrid improved seeds which mature more quickly or which have drought resistant qualities to fit into the short rainy season might be beneficial, so long as it is carried out in consultation with farmers, including women who are responsible for seeds. Other improved practices to retain and augment soil fertility and prevent erosion could also be useful.

Fencing is considered essential for maize in the foothills, a significant capital consideration. Techniques for improved maize cultivation have already been developed elsewhere in Indonesia, and some may be readily applicable to the conditions in the Tinombo area.

Maize is sufficiently popular as an element in the local diet that there probably would be interest in improving its productivity and continued local production of staples should perhaps be encouraged to avoid over dependence on non-food cash crops.

4.9 *Root crops*

Various root crops are grown for subsistence, the most common being cassava (ubi kayu). Root crops are very vulnerable to deprivations by wild pig, and fields and house lots where they are planted need to be fenced. Ubi is the cheapest staple that can be purchased in the market. Many poorer families in the foothills and the coastal plains who are producing tobacco or working for wages and are unable to grow enough staple foods buy cassava on a regular basis.

Ondot is a wild root crop found in shady forested areas. It is the "hungry season" standby, eaten by people who have no cash or other resources on hand. Finding enough for a few days can involve a whole days walking, foraging and carrying since the forests where it can be found are receding into the more distant hills. It contains a poison, and so needs to be carefully processed by soaking in sea water for two days, then fresh water for one day. A few baskets of this food were seen soaking in rivers and streams. Some families claimed to be eating it regularly during the research period in February (a dry and difficult period, waiting for rains in April). Others said that they resorted to ondot only during especially dry years, but not on an annual basis. Frequency of eating this crop could be a useful, locally specific, poverty indicator. Mention of the crop by the researchers brought the topic of hunger and seasonal difficulties into open discussion.

4.10 *Ground nuts, chilli peppers, fruit, vegetables*

Ground nuts are a familiar and profitable cash crop. Small amounts of other food crops are produced for sale in the region. Not enough information was obtained during the research period to comment on their potentials and constraints. The diet of the poor lacks protein, fruit and vegetables although it is possible that more of these items could be grown and consumed locally. There does not seem to be much emphasis on home gardens in the hills, perhaps because the houses themselves are built of very temporary materials and are moved frequently. On the coastal plane, poor sandy soils and the menace from wild pigs and untethered livestock are apparently significant disincentives to home garden development. Further discussions with women farmers in both uplands and coastal areas will be useful in identifying relish crops grown or gathered, and their relative significance in the farming system and in the diet.

4.11 *Fishing*

Each of the villages comprises a stretch of coastline as well as upland areas, and some coastal households obtain part of their income from fishing. The tradition seems to run in certain families, since those with no previous experience do not consider fishing as an option, and are said to get sea sick. The level of involvement in fishing will need to be more precisely measured in terms the numbers involved, time and capital commitments, and the significance of fishing income in relation to other sources. No one claimed to rely on fishing alone, because of its seasonality and uncertainty. Women did not appear to be involved in fish marketing. This is surprising since they are involved in many forms of small scale trade, and the information will need to be verified. Information was not obtained on women's involvement in fish processing (salting and drying).

There are three methods of fishing used. Line fishing from simple canoes, purse seining, and fish traps.

a) Purse seining is said to involve a capital investment of about Rp600,000. While the vessel used, known as a pukat, is made of local materials, the nets and equipment are imported from Palu. The fishing technique involves watching for a shoal of fish close to the shore and, when one is sighted, gathering eight crew members from whoever is nearby at the time to launch the pukat and make the catch. The division of shares is on the basis of half to the owner of the equipment and half equally divided among all the crew, including the owner. Although the capital involved is large, the equipment is not cooperatively owned by a larger group. A single catch with the pukat can bring in Rp100,000. However the ideal conditions for its use are sufficiently rare that it may only get to be used once a month or even less.

b) The rompong is a huge fish trap made predominantly from rattan, anchored 2-5 miles from shore. Most rompongs are individually owned, but one in

Dongkas is cooperatively owned by a group of seven. Members take turns to visit the rompong daily to check for any catch, the proceeds of which are equally divided, while any fish they catch by lines from their *perau* on the way is their own. The rattan materials for a rompong, if purchased, would cost approximately Rp250,000. Some fishermen collect at least part of the rattan required themselves from the forest, using cash only for other equipment.

c) Tambak (fish culture ponds) are being developed in the village of Dongkas, on former mangrove land. No mention was made by local officials of any consideration having being given to the environmental impacts or loss of marine habitat incurred by clearing the mangrove stands which were already partly destroyed (See 4.12 below). The process of land opening seems to have some similarities to other new land schemes in the area: wealthier villagers and non-villagers, including district officials and entrepreneurs from Palu registered for tambak plots of 1-5 hectares (of a total available land area of 40 hectares). Those with capital have begun to develop the land, using local wage labourers. Some villagers unable to raise the capital required have sold their rights to outsiders. One hectare of tambak land which has been cleared of trees but not developed reportedly sells for as much as Rp300,000. The land does not yet have title certificates, and so cannot be used as collateral for development loans. Only a few Dongkas families are attempting to open tambak themselves using their own labour, because for those with limited capital the investment of time is too great in relation to the delayed rewards.

4.12 *Forest products*

Little commercial timber extraction is taking place in the area. Ebony is present, but not abundant or easily accessible. Rattan is the most heavily exploited resource, with numbers of men in each village making rattan extraction their principal regular source of livelihood, while others collect rattan occasionally. The usual procedure is for the rattan dealer to supply rice and other food to a group of collectors, who then go into the forest for about a week, bringing the rattan out to an agreed location. The estimate obtained for returns to labour is about Rp12,000 for a week of work, before deducting advances for food. Rattan collectors agreed that the labour is quickly becoming more arduous as the distance to sources of rattan increases.

Mangrove forests have traditionally been used as sources of fuel wood, charcoal production and building poles. However, the rate of use has greatly accelerated in the past ten years and, according to local information, the mangrove forests along the coastal road were extensively logged and already substantially destroyed before the process of opening tambaks began. Two explanations were given. The improvement of the road made the forest accessible to trucks which, after delivering consumer goods to markets along the coast, would fill up with fuel wood or processed charcoal instead of returning empty to Palu. The rattan industry apparently uses a drying process requiring charcoal, and this greatly increased the rate of mangrove extraction in the last ten years. Details of the processing procedures are not clear, nor was it established whether the wood was shipped away to rattan processing locations, or primary processing was done on the spot. More information is required on this subject.

4.13 *Trade*

Women are extensively involved in bulking and distributing vegetables and fruit through the local market system. Women informants suggested that selling vegetables is an activity of fairly low status and very low returns, at tiny levels of capitalization,

engaged in by the poor, especially older women and widows but also younger women, married and unmarried. Capital levels quoted ranged from Rp5-20,000, and women claimed that very large numbers of their co-villagers are involved. More research will be required to determine the potential of using women's existing business skills in the small trade sector to improve their incomes through credit facilities and other means.

In each village the family welfare committee (PKK) is active in running small credit schemes for women who wish to trade and/or produce goods for sale. The capital funds were initially provided by the government, and are augmented through the interest charged. The schemes appear to be effectively managed, with the capital in strong demand and circulating continuously for periods of one week to three months, depending on the rules established by the committee in each village. Poorer women and those living in more remote areas are excluded from participation in these schemes since they require joining the PKK, paying a monthly membership fee, and attending meetings. In one village, Mensung, a woman leader was working on forming smaller groups among women of similar economic status in each neighbourhood to overcome this problem, although she had not received any seed capital from the head of the village PKK. Other credit available to women from the KUD and the BRI is not accessible to the majority of poor women, who lack land titles as security and do not dare to incur large debts. No women were reported to have requested credit for planting cash crops, instead focussing their efforts on trade.

Men appear to be more involved in longer distance trade, especially that using vehicles (e.g. the fish sellers on their motorbikes) or long hikes into the mountains to sell dried fish, sugar and other goods to the upland Lauje. Upland Lauje women are involved in bringing fruit and vegetable produce down to market, and buying other goods to sell on their return. Men appear to trade the goods they produce, such as their own fish and tobacco.

4.14 *Livestock*

Cattle are kept in each of the villages, but are too expensive for most people to own. Marketing arrangements have not yet been studied. Goats involve less capital, but are said to be more prone to disease, and more prone to be beaten by other villagers for intruding in their gardens. Goats are reported to be raised by the upland Lauje-bela, and are sold to markets on both coasts. Both goats and cattle are left to graze freely, although several of the villagers have plans to require them to be confined at night when they do most damage to unguarded crops. A villager in Mensung reported having acquired cattle through the share system, being permitted to retain the second offspring of a relative's stock the family had cared for, but it is unclear what the basis of this agreement was, since so little labour appears to be invested in animal care (unlike in Java, where cattle are stall fed). No information was obtained to indicate whether both men and women own cattle and goats. Chicken raising is almost universal among women, although the quality is poor and improvements could be made which would directly increase their incomes.

4.15 *Wage Labour*

The main wage labour opportunities within the villages are in the coconut sector, although these are seasonal, limited, and some require specialised skills that seem to be handed down in certain families. Since opportunities to work are scarce, they are probably allocated along lines of kinship or other social ties, although more investigation will be required to determine what these ties are.

Outside the village, young men work in the construction of roads and buildings. Girls work as assistants in food stalls in Palu. Some older men have worked as labour managers (*mandor*), recruiting young village men to take on contract work outside. The

standard daily wage for men is Rp2500. Women have very few if any wage opportunities inside the village.

5.0 Patterns of Inter- and Intra- Household Labour

5.1 *Interhousehold labour exchange*

Farmers were asked whether they worked their fields alone, or in groups with friends and neighbours. Most claimed to do both; i.e., to work alone for smaller fields or smaller tasks, but to call on larger work parties when there was a large task that needed to be completed quickly. While the principle of collective work is clearly a familiar and traditional one, more research will be needed to determine how frequently and in what circumstances this practice is actually used.

The principles described are fairly common in Southeast Asia. The basis of the work is strict reciprocity, a day for a day, and there is no element of social security or assisting the weak as suggested by such notions of "shared poverty". Children can substitute for parents if they are of working age, but an older man stated that he did not dare join collective work groups because of his inability to fully reciprocate; "people would say I am trying to gain a young man's labour in return for an old man's". A widow stated that she joined in collective work among women for women's tasks, but when asked if she could call upon men to clear a field for her she replied that she had never asked for, nor been offered, this service. Some farmers said that they did not call work parties because they did not have the means to provide the required food for the workers. For those with inadequate subsistence production, cash is needed in order to obtain access to exchange labour. The availability of both food and cash can be especially problematic at the time of year when fields need to be cleared and planted.

There was some consensus that opening new lands in thick jungle should only be undertaken by groups working in turn on each others' fields, and this labour arrangement influences the pattern of settlement, preventing individuals from breaking away from their hamlets to open new lands until a whole group is prepared to go together.

Collective work parties are formed primarily of close neighbours, those living in the same hamlet who are often, although not always, related. A number commonly quoted was ten. There seems to be little stress on leadership in the groups, although there are ritual activities requiring the services of a specialist. It is not clear whether the groups have very distinct boundaries, whether men and women form separate groups, or whether for tasks such as planting rice or maize, which involve both women and men, a household could send a representative of either sex. One farmer indicated that children are the most adept at planting, and form their own group working in turn on their parents' fields, but the basis on which they are compensated for this is not yet clear.

The practice of working in groups apparently does not extend to collective investments of pooling of capital. Households appear to be mainly autonomous economically, although there are significant economic relations between them which will be an important subject for investigation.

Neighbours do assist each other in house building, and, at the village level, there are compulsory weekly sessions for communal work during which roads and paths are maintained, the mosque yard cleaned, and other projects undertaken under the direction of the village head and his committee. There are apparently no communal village level marketing structures, such as cooperatives, although farmers groups are now being formed which may have some marketing functions.

5.2 *Intra-household patterns of labour*

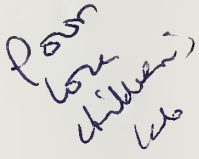
Economic relations within the household appear to follow a pattern familiar elsewhere in Southeast Asia. A married couple work together to support themselves and their children; there is a sexual division of labour for some tasks such as clearing fields and planting, but it is not very rigid and there is some substitution where circumstances require. Women are said to be responsible for managing cash, but it is not clear whether the emergence of new cash crops such as cocoa requiring substantial capital investments is changing this relationship. Husband and wife are said to be entitled to equal shares upon divorce, since they have laboured together, but again it is unclear how this works out in practice either with traditional assets (former swidden fields) or new assets -- fenced fields, cocoa trees, etc. --in which men appear to be the dominant party.

Young children are expected to help with domestic tasks, especially the care of siblings. Some villagers noted that there has been a shift in the division of household labour since children started attending school, preventing women from accompanying their husbands to the fields until the afternoon when the older children return to care for the younger ones.

Older children are entitled to work as labourers, plant fields, and engage in trade as early as they wish and are able, and their income is considered their personal property, not to be pooled with that of their parents. Girls as young as ten make snacks to sell in the market or at school. From age fourteen both boys and girls may have their own farms in which they plant onions, ground nuts or other cash crops. In the case of girls, their father helps them to clear a field, or allocates a section of the parents' field for the daughter to plant independently. There is no suggestion that children owe their labour to their parents as repayment for their upbringing, nor do they necessarily contribute to the daily consumption expenses of the household in which they reside, even while earning cash. Parents appear to encourage early independence rather than seek to maximize access to their children's labour in order to achieve collective family goals.

Children sometimes choose to ask their mother to save their money for them, asking for it when they wish to buy clothing or other goods. The major saving of young men is for their wedding, since they are expected to contribute a major share of the cash payment to the bride (common sums in the area being Rp200,000-500,000). It is not clear whether parents pay out for a son who has failed to save, or who pays for the feast, or whether girls who have been earning independently are also expected to help meet their parents costs.

An outcome of the emphasis on the economic independence of children is that their labour and capital are not freely available to augment that of parents still struggling to provide food and education to younger siblings, or wishing to undertake major projects such as developing new land. The children of the poorest people are least likely to be around to help, since they are often the ones who leave the village seeking wage opportunities outside.



Changes in inter- and intra-household economic and social relations in the context of the intensification of land use, property rights and the commercialization of agriculture is a field of study with significant practical and theoretical implications that will be pursued by the researchers in future work.

6.0 RESEARCH DESIGN

The research initiated with the rapid appraisal reported here is intended to have several phases, each of which will deepen and substantiate the information gained so far, as well as broaden the scope across space and time.

The three month research period May-August 1990 is intended to substantiate information and impressions gained from the rapid appraisal; provide more detailed information on some hamlets selected to represent distinct agro-ecosystems of the area; and initiate some detailed household case studies.

Subsequent field research periods will pursue specific issues, some involving basic research with policy implications, and others involving highly practical, participatory action research. In addition the researchers will broaden the area covered, by testing hypotheses derived from the detailed research over a wider area in the TTM region, and possibly other upland locations. They will also expand the research through time, by mapping changes in the selected households, hamlets, and the broader region, each with appropriate degrees of research intensity. With the upgrading of the coastal road, the introduction of new cash crops, and the opening of new lands in the interior of the peninsula, it is expected that the area will experience significant changes in the next five years. There is an opportunity to design a study that can record over a period of five to ten years a set of social and economic changes that have elsewhere taken decades. At the same time, it is possible that with a well researched set of baseline information and careful monitoring over the years, a development path can be charted which takes advantage of new approaches, avoiding some of the social, economic and ecological problems that are now apparent in the development trajectories experienced in other regions of Indonesia.

It is intended that some of the research will be carried out by Canadian and Indonesian graduate students, with assistance and supervision from the two principal researchers. Students could follow up particular issues, or carry out hamlet or household studies to broaden the coverage of the research to the many diverse micro-ecosystems of the area, while using similar methodologies to ensure comparability of the data. Local resource people from the area with skills in the Lauje language as well as basic literacy will also be able to assist extensively in data gathering, action research, and follow-up studies. Government and non-government agencies with interests in the research will be encouraged to participate, or to follow up particular topics of importance to their work.

The various elements of the proposed research program are outlined here.

6.1 *Intensive hamlet and household studies*

These studies will provide essential basic data on the modes of gaining a livelihood which are currently practiced in the area. The researcher's supposition is that farmers and workers, men and women, including the very poorest, have considerable knowledge about local resources, how they can be used to obtain a livelihood, and the constraints encountered in attempting to make that livelihood more adequate and secure. Research therefore has to begin from a careful study of what poorer rural people do, and the reasons why they pursue their current practices rather than others that may seem to outsiders, unaware of the constraints, more productive or otherwise beneficial.

Conceptually the intensive hamlet and household studies will be organized around an examination of means and relations of production. The main questions to be answered are: what are the resources (means) used in the production of livelihood? and what are the social relations through which these resources come to be accessible to the users?

Resources include bio-physical elements such as soil, water, wood, seed, pasture, non-cultivated food, forest products and technology and equipment. These are the elements most commonly investigated by ecologists, including those concerned with evaluating or assessing agro-ecosystems. To these resources, the current research will add others related to the contemporary context in the region such as capital, wages, licenses, seed,

agricultural inputs, marketing channels, land titles, and externally derived development funds and materials.

The social relations through which these resources are brought into production are equally important, and often neglected in ecologically oriented research. These include relations within the household through which resources are handed down through the generations, lent or borrowed, or developed through family labour and capital. They include relations with more distant kin, neighbours, friends, other villagers, traders, middlemen, officials and agencies. Each of these relationships is subject to a dimension of power and inclusion or exclusion. For example, a villager may state that one can always borrow land from others while in fact he would only approach and be successful in obtaining land from people with whom he has a particular social relationship. Likewise with access to reciprocal labour arrangements, credit, new lands, extension advice and other resources. It is essential to map out these patterns of relations in order to see how people gain and secure access to the resources on which they depend, and to understand how some people successfully control many resources while others do not, even when they are nominally available to everyone.

This research will provide basic data on the current livelihoods and strategies of the poorer farmers, and will lead to some proposals for means through which the livelihoods of the poor could be made more adequate and secure, based upon resources they already control, or to which they could realistically gain and maintain access, given the existing set of social relations.

The data will be obtained through two methods, both of which are intensive, sensitive, yet sufficiently quantifiable to permit periodic replication over the long term research period.

a) Based on the detailed rapid appraisal data for each of the villages (see appendix 1), a typology of agro-ecological zones will be developed which will serve as the basis for the selection of two or three representative hamlets for detailed study. Semi-structured interviews will be carried out with every household in each hamlet, with a target of a total of sixty households. Interviewing every household will avoid biases against the poor, or against female headed households which tend to be present in rapid appraisal or interview-based research which relies on selective introductions. It will also provide a basis for understanding kin relations, social and economic ties, and approaches towards common property within the hamlets, which appear to be significant corporate units in the uplands. This type of data cannot be obtained by mass surveys which interview randomly selected individuals, abstracted from their social and ecological context.

   Topics to be included in the interviews are household composition, relationships within the hamlet, the village, and the region; education; means of livelihood, including resources and relations through which they are accessed; seasonal patterns; life story and experiences; temporary or periodic migrations; experiments, hopes and plans.

   These data will be obtained for all men and women in the household over age 14. Special attention will be paid to older people able to provide histories of local land use. Maps will be drawn to locate common, household and individual property for subsequent cross checking by field visits and as a baseline for recording change.

   It is estimated that the interviews and preliminary data analysis will be completed in a period of five weeks.

b) Based on the hamlet data, ten or twelve households will be selected for intensive case studies. The case study approach is able to provide essential, qualitative data on social relations, local knowledge, strategies and priorities as well as quantitative data on elements difficult to measure accurately by less intensive means, such as time use, resource use, production, and daily and annual cash flows. The case study data will provide a useful cross check on the accuracy of the hamlet survey data, and a source of interpretive insight on social and economic processes that can subsequently be tested by extensive methods over a wider area. The households will be non-randomly selected to represent patterns of variation according to criteria that emerge as significant from the hamlet data. These could be aspects such as agro-ecological zone, resource base, household structure or stage in family life cycle and principal livelihood strategies.

   The methods employed for the household studies will include quantitative techniques such as time use studies, measuring of field plots and yields, budgets and inventories as well as qualitative appoaches including special topic interviews and participant observation. The time use studies will be especially important in understanding the allocation of time to various activities by different household members, priorities assigned to alternative use of time in terms of their perceived productivity and importance, and for detailed checking of the resources actually used in the course of a day, together with the social relationships involved.

   It is expected that each household will be visited approximately ten times over a seven week period in July and August. If it proves possible to identify local research assistants (such as school teachers) with sufficient interest and capabilities, they will be requested to maintain some elements of data gathering, such as monthly time use schedules and field inventories, over the entire annual cycle when the principal researchers are absent. If this is not possible, alternative methods will be used to acquire data on seasonal patterns.

Timing for hamlet and household studies: basic data collection May-August 1990, with subsequent follow-up studies covering different periods in the agricultural cycle and extending over a duration of 5-10 years.

6.2 *Issue studies and action research*

The hamlet surveys and household case studies are expected to generate a substantial research agenda, but some issues that appear from current information to be worthy of further research can already be identified. These studies could be carried out by the principal researchers, Indonesian and Canadian graduate students, voluntary agencies (NGOs), government agencies, or an appropriate combination of these groups. Priorities for research will have to be established. Possible topics are:

a) The sustainability of the swidden agro-ecosystem of the upland Lauje-bela, to determine whether it is viable in the long run, how it can be intensified in culturally appropriate ways if this is deemed desirable, how it will be affected by the opening of lands through new roads and the accelerated progression of lowlanders into the hills, how it is being affected by mission activities, and how the livelihoods of the uplanders could be made secure and sustainable for the long term.

b) The nature of the cultural and agro-ecological frontier between the Muslim and non-Muslim upland Lauje, both historically and in the current context of the commercialization of relationships along the frontier as land and other

goods begin to change hands for cash. This is important to an understanding of the long term cultural and agro-ecological history of the area, since the groups appear to have some common and some distinctive production patterns and preferences, with different ecological impacts on the area. Moreover it appears that there is a fluid cultural and ecological boundary rather than two really distinct groups, so that uplanders may engage in various strategies and make choices among a range of cultural, ecological and agricultural options. The study could reveal alternative viable trajectories for upland development based on the full range of local indigenous knowledge and practice.

c) The detailed case study of the policy, politics, economics and practice of a new land development scheme, to determine the potential of these projects to establish secure and sustainable livelihoods for the poor. This could result in practical guidelines for new land projects in the area which ensure that vulnerable groups become full participants and beneficiaries.

d) A pilot participatory action research project with a small group of farmers to identify potential means of intensifying production and rehabilitating degraded lands in the foothills. Approaches adopted will have to meet the objectives of the poor, beginning with resources they control, and using techniques and an intensity of investment which matches the land, labour and capital they can make available. This would be pursued with the objective of developing technical and organizational approaches potentially applicable elsewhere in the region. Models are available from the literature on upland development, but they are seldom appropriate "off the shelf". A participatory process is required to determine means and objectives according to the highly specific, local conditions characteristic of upland areas. The skills for undertaking a participatory planning process, and supporting the efforts of poor upland farmers, could usefully be transferred to appropriate government and non-government agencies through their participation in the action research.

e) A pilot participatory action research project with poorer village women, beginning with support to and extension of the credit schemes they have already put in place. The women seem to be expert in local market research, having very good ideas for small businesses that could thrive in the local context. They also appear to have effective social sanctions in place to prevent mishandling of funds or non-repayment of credit. A problem which the women could participate in solving is that of finding means to extend credit to the poorest women, who still tend to be excluded from credit schemes or to exclude themselves because of fear of default. Management of capital at the sub-village level or preferably to even smaller groups could avoid the problem of funds being monopolized by a few. Incentives could be devised to encourage the stronger members to bring in and support the weaker ones, creating a situation in which "everyone wins" from the advance of the poor. At present PKK leaders are rewarded for managing an efficient credit scheme with minimum default, and this has led them to exclude the poor, despite recognition of, and concern for, their needs.

f) A pilot participatory action research project in one village, confronting in a direct and positive manner the issues of poverty and inequitable access to resources. The objective would be to encourage local officials, including district and village leaders, the LKMD and LMD, to consider equity issues in their plans for the village, and come up with strategies for improving the livelihood of the poor. The approach would be to attempt to incorporate the powers and skills of elites as positive factors for, rather than obstacles to, village development. This could be accomplished by emphasising the

seriousness of the national government policy of seeking equity in the development process, and insisting that regional and village development funds be used to benefit all members of the community, including or especially the poor. Processes must be devised through which the elites will be rewarded with increased political, social and economic status for their part in ensuring that national development goals are met.

An opening to achieve this may have been created by the call to villages to be self-sufficient. In the recent "orientasi LMD" process the villages were called upon to assess various village resources that could be taxed, with the incentive that administrative salaries for themselves as well as funds for village development would depend on their success in this effort. It became obvious to the village leaders that a substantial proportion of the village population is not producing anything that can be taxed, surviving on subsistence production in the hills or wage work, often outside the village. Larger revenue flows would benefit everyone, and the tax base of the village could be broadened if the elite supports efforts to make full use of village energies to develop village resources.

Village leaders interviewed expressed dissatisfaction with the current state of development of their desas, and optimism about potential assistance from SRDP. They may well repond positively to the equity objectives of the project, if these are presented to them clearly, and they are called upon to participate in finding solutions. The example of a successful pilot project could be useful here in demonstrating what can be accomplished even in the poorest villages.

6.3 *Regional level research*

There are three aspects of regional research to be considered. The first is that the households, hamlets and villages selected for intensive study all exist within wider contexts, and many of the opportunities and constraints they face are the outcome of processes at higher levels. In order to understand these contexts and linkages, a historical, regional and political economic perspective is required. Such an approach goes beyond local or regional level descriptions and asks questions about the relations between different cultural groups and social classes with differential access to land, capital and other resources, and the impact of roads, larger settlements, markets and the regional economy as a whole.

The second aspect is that all individuals in the area appear to have direct personal links to other villages in the region, through kin, wage labour, property ownership or other means. The opportunities available to individuals are weighed up in a regional context, not just a local one, as the patterns of migration along the coast and from the coast into the mountains demonstrate. Through the hamlet and household case studies it is intended to trace some of these direct linkages, following up those who have left, those who stay behind, and the factors they consider when evaluating various options for obtaining a livelihood.

The third aspect of research at the regional level will be to establish the applicability of findings from the intensive studies to a wider area, initially within the region, and subsequently to other coastal and upland contexts. Coastal zones and uplands are well known for the diversity of their local micro-ecosystems, cultural groups, languages and so on. Rarely however will resources be available for comprehensive local research of the type here being proposed. It is therefore necessary to attempt to discover themes and issues, as well as practical policies and programs, that can be applied over wider areas, albeit with the caveat that participatory processes will also be needed to solve development issues in each location. To accomplish this goal the researchers will test some aspects of the research elsewhere in the immediate region. They will also participate in networks of others working on similar issues, such as the uplands research group in

Java (KEPAS), the Institute of Environmental Studies and Management (IESAM) in the Philippines, participants in the Southeast Asian Agroecosystem Network (SUAN), the Environment and Policy Institute at the East-West Centre Hawaii, the Institute of Development Anthropology (SUNY Binghampton), the Institute of Development Studies (IDS, Sussex), appropriate NGOs within and outside Indonesia, researchers working on land issues in relation to indigenous peoples in Southeast Asia, and others as appropriate.

6.4 *Long term study*

It is no longer accepted in the social sciences that one can understand a society by studying it at one fixed point in time, since processes of change are an integral part of social life. In a region experiencing very rapid change such as TTM, the need for a strong time dimension is particularly apparent. New infrastructure is being built in the region, and this will have significant impacts on the livelihood security of the indigenous population whose resources are becoming ever more accessible to outsiders. The long term process of commercialization of the regional economy, which has been taking place for decades, is now progressing very rapidly. This process will affect social and economic relations at all levels, including those between women and men, between generations within the household, between co-villagers, between different cultural groups, and between citizens and the state. These topics are central to the academic goal of understanding social and economic life. They also have a very practical significance, since Indonesia, like other states, has taken on the responsibilty of ensuring that this process of change or "development" is both sustainable and equitable. The current study aims to make a small contribution to the understanding of these issues at both theoretical and practical levels.

The methods that will be used to obtain long term data on the area include follow-up studies on the selected hamlets and case-study households; follow-up studies on the outcomes of any action-research projects attempted; and broadly based analyses of trends in the region using an appropriate combination of macro and micro data.

6.5 *Research Impact*

The 1990 research is supported by "Environmental Management Development in Indonesia", a joint project of the Ministry of State for Population and Environment, Government of Indonesia, and the School for Resource and Environmental Studies, Dalhousie University Canada, with funding from the Canadian International Development Agency. Each of these three institutions has an interest in obtaining relevant, insightful and accurate information from the research, in support of their policies and programs for sustainable and equitable development. Funding is also being provided by the Canadian Social Sciences and Humanities Research Council, and other sources will be approached to provide funding for future phases of the research.

As noted in the introduction to this report, the research location was suggested as a result of the Central Sulawesi Provincial Status Review which was undertaken as a planning activity under the Sulawesi Regional Development Project (SRDP). SRDP is a project of the Directorate General of Regional Development (BANGDA), Government of Indonesia, and the University of Guelph, in cooperation with the Canadian International Development Agency. The SRDP creates a context in which there are additional resources for rural development in the TTM area of Central Sulawesi, and considerable optimism that the next ten years will see a marked improvement in the regional economy. The challenge will be to ensure that this development process is both equitable and sustainable.

The research described here is intended to have an immediate, practical value in support of regional development initiatives in the TTM area. The basic research and action research components of the project described here focus on the most critical areas of land, and the poorest groups of people, where the success of the SRDP most needs to be felt. It is hoped that, through its institutional development focus, SRDP will be able to develop the policy and programing implications of the research, including the institutional learning experiences gained from the pilot action research components. Where useful and appropriate, these may be worked into regional development plans, together with appropriate and effective modes of implementation that can endure over the long term.

School for Resource & Environmental Studies
Dalhousie University
1312 Robie Street
Halifax, Nova Scotia, Canada B3H 3E2

Kantor Menteri Negara
Kependudukan dan Lingkungan Hidup
Jl. Medan Merdeka Barat 15
Jakarta Pusat 10110, Indonesia

EMDI

Environmental Management Development in Indonesia